California Regional Water Quality Control Board
San Francisco Bay Region

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Ms. Nina Bicknese
U.S. Army Corps of Engineers
Sacramento District Planning Division
1325 J. Street
Sacramento, California 95814-2922

December 22, 2000

Subject: SFRWQCB Comments on *Draft General Re-evaluation and Environmental Report for Proposed Project Modifications, Guadalupe River Project, Downtown San Jose, California.*

Dear Ms. Bicknese:

Staff of the Regional Water Board thank you for the opportunity to comment on your *Draft General Re-evaluation and Environmental Report for Proposed Project Modifications, Guadalupe River Project, Downtown San Jose, California* (Report). In general, we support the Corps in its mission to provide flood protection for Santa Clara residents, and appreciate the Corps' inclusion of stream stewardship in the project design and implementation. Staff have worked with the Guadalupe River Flood Control Project Collaborative (the Collaborative) on flow, temperature, and habitat considerations. We believe the design alternatives in the report sufficiently address those issues and commend your project planners for their efforts.

As you know, the Guadalupe River drains the New Almaden mercury mining district, which was at one time the largest producer of mercury in North America. Mercury is a pollutant that impairs beneficial uses by accumulating to levels in fish that are threatening to human and wildlife consumers. These comments below are intended to help the Project address environmental impacts due to mercury in the design considerations. We are developing a total maximum daily load (TMDL) for mercury in the Guadalupe River and all of San Francisco Bay, which will have significant implications for all construction and maintenance operations in the Guadalupe River and its tributaries. Current regulatory requirements also have important implications for the Project. We hope that you find these comments helpful and look forward to continuing to work with the Army Corps and the Collaborative.

1) Regulatory Framework

The TMDL for mercury in San Francisco Bay will likely be considered by the Regional Board in early 2002. The Guadalupe River mercury TMDL is planned to be considered by the Regional Board in 2004. Until TMDLs are adopted through public process, all of our evaluations and recommendations regarding mercury are based on *existing* water quality objectives, as contained in the 1995 San Francisco Bay Basin Water Quality Control Plan (Basin Plan). We appreciate the

RWQCB-1

report's consideration of our proposed TMDL (e.g., Vol. 1, p. 4-27), but when discussing compliance, it is appropriate to refer to the Basin Plan. RWQCB-1

On a practical level, when the TMDL is adopted as policy through public process and in compliance with all statutory requirements, the issues related to mercury will remain the same. This is because the TMDL will steer towards attainment of existing water quality standards. The difference will be that compliance can be evaluated using the tools of mass loading. So it is worthwhile to evaluate masses of mercury involved when removing or immobilizing sediments, as long as it is clear that any direction from the Regional Board is based on our existing regulatory authority, rather than a proposed TMDL. RWQCB-2

2) Water Quality Objectives

There are three relevant objectives that should be considered related to water quality impacts:

i) Our Basin Plan numeric objective for total recoverable mercury in water (0.025 µg/L). The freshwater objective is often cited as 0.012 µg/L, but that number actually appears in a footnote, listed as "desirable." In many of our freshwater NPDES permits, we use the 0.012 value based on Best Professional Judgment. For this analysis, we should just consider the 0.025 µg/L limit.

ii) U.S. EPA's California Toxics Rule numeric criterion for total recoverable mercury in water (0.051 µg/L). This number applies in San Francisco Bay south of the Dumbarton Bridge, which is the receiving water for the Guadalupe River. RWQCB-3

iii) Our Basin Plan narrative objective for bioaccumulation:
"Many pollutants can accumulate on particles, in sediment, or bioaccumulate in fish and other aquatic organisms. Controllable water quality factors shall not cause a detrimental increase in concentrations of toxic substances found in bottom sediments or aquatic life. Effects on aquatic organisms, wildlife, and human health will be considered."

Attainment of the first two numeric objectives depends on the amount of suspended sediment present and the mercury concentration of the suspended sediment. Making the reasonable assumption that essentially all of the total recoverable mercury is in the particulate form, we get this relationship: RWQCB-4

1) $[Hg]_{tot} = [TSS] \times [Hg]_{sed} / 1{,}000$

$[Hg]_{tot}$ = total recoverable mercury concentration, (µg mercury / L water)
[TSS] = total suspended sediment (mg sediment / L water)
$[Hg]_{sed}$ = sediment concentration of mercury (µg mercury / g sediment)
1000 = converstion factor for milligrams to grams.

RWQCB-4

Equation 1 helps us evaluate the question, "how does mobilization of mercury-laden sediment cause exceedance of numeric objectives?" Table 1 below shows the maximum mercury concentrations in sediment that would attain numeric objectives of 0.025 and 0.051 µg/L for three different levels of suspended sediment. The point of the calculation is that for typical stream and Bay suspended loads, mercury concentrations in sediments greater than 1 µg/g (ppm) will certainly cause exceedance of water quality objectives, and concentrations more like 0.3 µg/g (ppm) are needed to ensure that numeric objectives are attained most of the time.

[Hg]Tot	TSS = 25	TSS = 100	TSS = 200
0.025	1.00	0.25	0.13
0.051	2.04	0.51	0.26

Table 1: Maximum mercury concentrations (µg/g) in sediment required to attain total recoverable mercury concentrations in water of 0.025 µg/L and 0.051 µg/L for TSS levels of 25, 100, and 200 mg/L.

To evaluate water quality impacts related to the proposed Project, we should start with a simple question. How much mercury-laden sediment is currently available to be mobilized from the proposed project area, and how much (or how little) will be mobilized after the Project? There's a connection between mobilization of polluted sediments and exceedance of numeric water quality objectives. The evaluation of environmental impacts must include some assessment of pre- and post- project inputs of highly polluted sediments to the Guadalupe River and Lower South San Francisco Bay. The evaluation also needs to consider mobilization during the 100-year flood event; our current experience of sediment transport is limited to 30-year floods or less.

RWQCB-5

As you know, mercury bioaccumulates primarily as methylmercury. The water quality objectives discussed above are based on total mercury, not methylmercury. Therefore, the narrative objective also needs to be considered, because it more directly addresses mercury accumulation in aquatic life.

The key piece of the narrative objective as it relates to declaration of impacts is that the Project (as a controllable water quality factor) "shall not cause a detrimental increase in concentrations of toxic substances found in bottom sediments or aquatic life." Mercury concentrations in bottom sediments have already been discussed above.

The question we need to ask related to the narrative is "will the Project result in increased mercury concentrations in aquatic life?" We should recognize up-front that we cannot answer that question definitively with the information we have at hand. Mercury methylation and demethylation is extremely complex. The best we can expect is some reasonable assessment of pre- and post- project methymercury production, and a commitment to monitor methylmercury in water, sediments, and organisms after completion of the Project. So whenever we ask for information about methylmercury, we are addressing our narrative water quality objective for bioaccumulation. RWQCB-6

3) Sediment Cleanup Action Levels

The Project includes a proposed requirement that sediments containing more than 0.1 mg/kg total mercury are not to be reused onsite (Vol. 1 p. 3-37), and cites this as a "goal of the TMDL program for mercury in the San Francisco Bay Region" (Vol. 1 p. 4-27). There are two points we should clarify about this:

i) In the TMDL report we submitted to the U.S. EPA, 0.1 mg/kg is cited as the pre-anthropogenic mercury concentration in sediments, not the proposed target. We proposed a target of 0.4 mg/kg in fine sediments (<63 μm). RWQCB-7

ii) The TMDL is still being debated in a public process, so the final value of the sediment target is still undetermined.

We commend the plan for considering action levels for mercury in sediment. As you can see from Table 1 above, residual mercury in sediments would need to be around 0.1 mg/kg or less to ensure that numeric water quality objectives are met everywhere all the time. However, it should be recognized that prohibiting reuse of sediments containing more than 0.1 mg/kg mercury, may effectively prohibit reuse of all sediments. Essentially all of the sediment moved in that watershed will be above 0.1 mg/kg. So, referring back to our narrative objective for bioaccumulation, we need to agree on a cleanup level for sediments that represents a *controllable* water quality factor.

Another related question is whether the sediment reuse prohibition means removing sediments from the watershed, presumably to a Class 1 landfill, or whether it is acceptable to dispose sediments deemed unfit for reuse at another approved disposal site, such as a local Class 2 or Class 3 landfill. Clearly, sediments with mercury levels exceeding human health hazard levels (e.g., > 20 ppm) will have to be disposed as hazardous waste in a Class 1 landfill. But will it be necessary to take sediments with less than 20 ppm mecury to a Class 1 landfill outside the watershed? RWQCB-8

We discussed this issue in a teleconference on August 16, 2000 with your staff, staff of the Santa Clara Valley Water District (SCVWD), staff of the United States Fish and Wildlife Services (USFWS), and the California Department of Fish and Game (CDFG). From the above considerations and that August 16 discussion, we recommend the following modification to the soil reuse plan:

i) Sediments with mercury concentrations >20 ppm must be disposed of in a Class 1 landfill.
ii) Sediments with mercury concentrations between 1 and 20 ppm may be disposed of in a suitable Class 2 or Class 3 landfill. Project managers will have to coordinate with landfill operators to determine if they will accept the sediments. The Regional Board also has permitting authority over landfills. We are available to discuss the overall water quality implications of landfill disposal.
iii) Onsite soil reuse and overexcavation should be done in a manner consistent with the Guadalupe Creek Restoration Project Soil Management Plan (attached).

RWQCB-9

The issue of landfill disposal of polluted sediments has long-term implications for watershed management. In the proposed TMDL, we argue for recycling of mercury-containing fluorescent lights, which could prevent up to 250 kg mercury per year from entering local landfills. At the same time, we are currently guiding the Army Corps to dispose potentially thousands of kilograms of mercury in local landfill through soil and sediment removal.

The explanation for this apparent contradiction is in the chemical form of mercury. Mercury in fluorescent lights is primarily elemental, which vaporizes readily. So we consider improper disposal of fluorescent lights to be a diffuse air source, and recycling to be the best way of reducing risk from this source. In our best professional judgment, mercury in sediments is much less volatile than mercury in fluorescent lights. The environmental risk from mercury-laden sediments from the Guadalupe River watershed is due to transport into Lower South Bay, where conditions may favor methylation. Removing polluted sediments from the aquatic ecosystem reduces this environmental risk. This is the best guidance we can offer given the available information. Our agency will need to investigate this question in greater detail as we proceed with TMDL development.

RWQCB-10

4) *General Guidance for Project Design to Minimize Mercury Impacts*

From the above discussion, we can offer five general guidelines that we will use to evaluate the Project with respect to mercury contamination:

i) Measure mercury and methylmercury concentrations in soils ahead of time. The plan calls for measurement every 2500 cubic yards, which is acceptable.

RWQCB-11

ii) Move as much polluted soil as possible out of the aquatic ecosystem. As discussed above, we need to resolve action levels and disposal practices, but we can offer some interim guidance.
iii) Maximize erosion control, both during project implementation and after project completion. Accepting that it's impractical move every cubic yard of mercury- polluted soil out of the watershed, ensure that soils left on the ground stay out of the aquatic ecosystem. We encourage preventative, proactive measures over addition of more hardscape. Such measures include revegetation and identifying and correcting potential instabilities through adaptive management. RWQCB-11
iv) Minimize the potential for mercury methylation in the Project's design. Mercury is methylated by sulfate reducing bacteria, which favor anoxic and suboxic wetlands and marshes. In the design, stagnant pools and wetlands should be avoided.
v) Monitor post-project to verify that design goals with respect to erosion control and mercury methylation were achieved, and modify as appropriate.

5) Mercury loads involved

It will be helpful to quantify the mercury involved, even though we are not, at present, regulating under a TMDL policy. Table 2 below quantifies the masses of mercury associated with various sediment volumes and mercury concentrations. These masses are significant. To put them into perspective, annual loads of mercury in wastewater total between 20 and 50 kg per year in all of San Francisco Bay. The Project has the potential to make a tremendous impact on the annual mass loading of mercury to San Francisco Bay. RWQCB-12

	Cubic yards of sediment		
	10,000	50,000	100,000
Average Concentration, ppm			
1	15	76	153
10	153	765	1529
20	306	1529	3058
50	765	3823	7645

Table 2: Mercury masses (kg) associated with mercury concentration and volume of sediment removed or immobilized.

6) "No Action" alternative

Regarding your "no-action" alternative, it should be highlighted that under this option we would miss an opportunity to make significant progress towards remediating a polluted watershed. RWQCB-13

Conversely, under all of your other project alternatives, the Regional Board would have opportunities through its ability to issue 401 Certifications and Waste Discharge Requirements to oversee appropriate monitoring and cleanup actions that can make substantial near-term progress towards attaining water quality standards. RWQCB-13

7) Seek opportunities to trap and remove mercury-polluted sediments before they enter Lower South Bay.

The principal source of mercury in the Guadalupe River watershed is the New Alamaden mining district. Through implementation of the Guadalupe River TMDL, we will propose actions that will reduce or eliminate ongoing loads to the Guadalupe River from upland pollution, but the entire stream system below the watershed has been polluted as well. We also would like the Corps to consider whether any of the proposed design alternatives could allow a trapping zone, where mercury polluted sediments can be removed before they enter Lower South Bay. As part of this project, We would like to know if such a trapping zone is feasible, and whether it would result in a net environmental benefit. Likewise, are there other measures that can be incorporated into the Project, possibly in conjunction with SCVWD, the Santa Clara Urban Runoff Pollution Prevention Program, and/or any of that Program's members? RWQCB-14

The Project Effects section (4.8.1) states that over 90 percent of the bottom load will be deposited between Trimble Road and Montegue Expressway, and that this reach will be periodically dredged by the SCVWD to maintain the channel. In the adaptive management of this project, we should determine how much mercury that regular dredging would remove, how much mercury would still be conveyed to Lower South Bay, and what is the chemical form and fate of that mercury that does make it into Lower South Bay. RWQCB-15

8) Attraction of anadromous fish into mercury contaminated waterways

Stakeholders have raised the concern that some aspects of the Project, such as the upper Guadalupe Creek mitigation, will have the effect of attracting fish into mercury contaminated regions. We agree that we need to work closely with the other resource agencies (United States Fish and Wildlife Services, National Marine Fisheries Services, California Department of Fish and Game) to assess environmental impacts from this process.

Our position is that the habitat restoration aspects of this project simply highlight the requirement which already exists under the Clean Water Act to clean up mercury pollution. We would not want to see stream restoration inhibited because the watershed is polluted. Full restoration of beneficial uses in the Guadalupe River watershed is a long term project. Both aspects, cleanup and habitat restoration, need to proceed in tandem. RWQCB-16

9) Monitoring methods

Your monitoring methods present a good general framework for adaptive management. We suggest you also consider determining the chemical form of mercury in porewater, which is relevant to both direct toxicity and mercury bioavailability. To evaluate the potential for methylation, we would like to see a suite of redox indicators. Some good candidates are nitrogen species (ammonia, nitrite, nitrate), dissolved manganese, sulfides, and dissolved oxygen. RWQCB-17

10) Track additional costs related to mercury

Additional monitoring, project design, and remediation actions incur additional costs. The proposed mercury TMDL, if adopted, will require significant commitments from SCVWD and its partners to continue monitoring and remediation activities. State law requires that any policy change takes into account economic impacts. We would appreciate it if your staff can track additional costs incurred relative to meeting existing regulatory requirements, including monitoring, soil re-use and disposal, and modeling. That information will help us present to the public a credible assessment of the total cost of controlling mercury inputs from the Guadalupe River watershed into San Francisco Bay. RWQCB-18

11) General comments from hydromodification staff (Jill Marshall)

The Corps, SCVWD and JSA have gathered a large amount of data in the development of the Project. Some of the information on hydraulics, sediment transport and pre-project and post-project conditions gathered throughout the Project's design phases might contain information that can help reduce mercury loading to the Bay, especially relative to mercury source areas. While the Environmental Report does not contain this information, Board staff could make recommendations on reevaluating some potentially available data that would aid in future decision making. Thus, the following questions are intended to gauge what data potentially already exists. Most of these questions can be readily answered as either "yes, the data exist" or "no, additional studies would be required to address that."

The table below illustrates some source areas of mercury in the Guadalupe River system, and some different mechanisms to consider when evaluating the potential for mercury bioavailability.

Sources	Supply	Storage and Exchange	Transport
New Almaden Mine	x		x
Channel Bed	x	x	x
Channel Banks	x	x	
Floodplain	Under some conditions	x	

i) **Potential Data Tools**: Is there existing information on sediment transport (i.e., sediment rating curves, predictive sediment transport models, channel depositional and scour rates, information on bed material, floodplain soils and measured wash loads) that could provide information on potential mercury-laden sediment storage areas? Can current floodplain elevations be compared to known floodplain elevations taken from the as-builts and used to establish deposition rates in the floodplain? Is it possible to combine depositional rate information, spatial variations in particle size distribution in the floodplain and recent hydrologic data to target certain depositional areas as likely sources of mercury? RWQCB-19

ii) **River Management and Maintenance Opportunities**: Identification and removal of sediment sources upstream of the West Santa Clara Bypass Channel could be an opportunity to reduce a greater percentage of mercury-laden sediments before it they mix with sediment from the Los Gatos Creek drainage. Are there depositional features upstream of the Guadalupe-Los Gatos confluence that could be "mined" for mercury-laden silts and clays? Are there areas that should be managed to minimize anaerobic soil conditions? Flood control maintenance efforts should focus on excessive sedimentation prevention in the least environmentally damaging manner. For example, the operations and maintenance agreement might include revegetating floodplains following large sediment deposits to prevent sediment remobilization. RWQCB-20

12) Summary of Regional Board comments

In summary, these comments present a great deal of information intended to help guide the Project's design and the evaluation of its environmental impacts due to mercury. The comments do not require substantial changes to the Environmental Report. The main areas that need to be changed are:

i) References to the proposed TMDL. Refer to the existing Basin Plan requirements. It is fine to consider the TMDL, but it should be clear that the Project is not required to comply with a proposed policy;
ii) Modify the soil reuse plan as discussed under comment (3);
iii) Include discussion of mercury monitoring and cleanup opportunities for the Regional Board in your assessment of the "no action" and "proposed alternatives";
iv) Add porewater and redox indicators to the mercury monitoring section (4.8.3.1); and
v) Consider or address questions in hydromodification under comment (11).

RWQCB-21

We hope you find these comments constructive and helpful, and look forward to working with you more on this complex issue. If you have any questions, please contact Dr. Khalil E. Abu-Saba at 510-622-2382, or abu@rb2.swrcb.ca.gov.

Sincerely,

Bruce H. Wolfe
Chief, Watershed Protection Division

Cc: David Chesterman, SCVWD

Attachments: Comments on SCVWD Soil Management Plan for Guadalupe Creek (3 pp.)

Comments on Soil Management Plan
Proposed by the Santa Clara Valley Water District

Khalil Abu-Saba
San Francisco Bay Regional Water Quality Control Board

11-14-00

The Santa Clara Valley Water District (SCVWD) must excavate, move and replace soils and stream sediments to complete projects for flood control, stream restoration, and watershed stewardship. The Guadalupe River watershed has been severely impacted by mercury contamination from the New Almaden mine, which was at one time the largest producer of mercury in North America. Soils and sediments in the upper watershed, streams, and floodplain have mercury levels high enough to cause violations of water quality objectives. Recent monitoring by the Water District suggests that the mercury in those soils and sediments is available for methylation and bioaccumulation, potentially threatening the health of human and wildlife fish consumers. RWQCB-22

The proposed soil management plan (SMP) addresses the complex problem of terraforming in a mercury-polluted landscape. The intent is to ensure that projects improve conditions with respect to downstream transport and methylation of mercury. The SMP is proposed for the Guadalupe Creek restoration project, which is to begin in the spring of 2001. The Guadalupe creek SMP should be consistent with that of the Lower Guadalupe River flood control project, also scheduled to begin in 2001.

We agree with the overall approach stated in the SMP (Figure 1 and Figure 2). If implemented as proposed, the projects should result in improvements to water quality with respect to mercury transport and bioaccumulation. Our only comments are:

1) We suggest defining the active channel using the three-year event elevation, rather than the two-year event. A slightly higher elevation improves the chances for revegatation and stabilization of the emplaced soils. For now, it is not appropriate to require even higher elevations for placing soils that are above 1 ppm, as erosional processes in the upper watershed will continue to deposit mercury polluted sediments along the banks downstream during flood events. RWQCB-23

2) In future projects, as we get more control over release of polluted sediments from the watershed, we will ask for soil management plans to move mercury-polluted sediments to even higher elevations, such as the ten or twenty year event.

We thank the staff of the SCVWD for the opportunity to comment on the SMP, and look forward to a continued partnership in the challenge of watershed rehabilitation.

Soil Management Plan for Guadalupe Creek Proposed by SCVWD

The Soil Management Plan (SMP) includes protocols for classifying the content of wastes in soil based on standard analytical tests used for the disposal of material at appropriately licensed disposal sites (CH2MHill 1994). The soil management plan also provides criteria for classification of material considered inert based on California's standard waste extraction test procedures, as well as procedures for disposal and reuse of these materials. At an appropriate time prior to disposal, confirmation sampling for all constituents of concern, including metals, hydrocarbons, and polynuclear aromatic hydrocarbons will be conducted and the soil classified pursuant to the criteria outlined in the approved SMP. RWQCB-24

Prior to project implementation, the Soil Management Plan will be updated to reflect final project design and to incorporate input from the Regional Water Quality Control Board (RWQCB) regarding management of soils containing elevated mercury concentrations. The updated Soil Management Plan will be submitted to the RWQCB for approval prior to implementation.

The following additional restrictions on soil management will be included in the SMP:

Excavated soils with mercury concentrations not exceeding hazardous waste criteria but greater than 1 part per million (ppm) may not be reused on site unless such sediments are placed above the low flow channel or in adjacent areas where frequent exposure to overbank flow is not anticipated to occur(i.e; above the water surface elevation defined by the 3-year recurrence interval or as backfill away from the channel).

Excavated surfaces above the 3-year recurrence interval elevation which contain mercury concentrations higher than hazardous waste levels will be overexcavated and replaced with soils meeting the above criteria for on-site reuse. Excavated surfaces below the 2-year recurrence interval elevation which contain mercury concentrations greater than 1 ppm will be overexcavated and replaced with clean imported soil. The 1 ppm requirement is based on regulatory guidance from the RWQCB (Aug 2000) which states that reducing bank sediment concentrations of mercury to 1 ppm or less will reduce water column concentration of total recoverable mercury. Water quality in the project area presently exceeds Basin Plan numeric water quality objectives for mercury. Therefore, incorporation of the proposed soil reuse restrictions will result in improved water quality under post project conditions. RWQCB-25

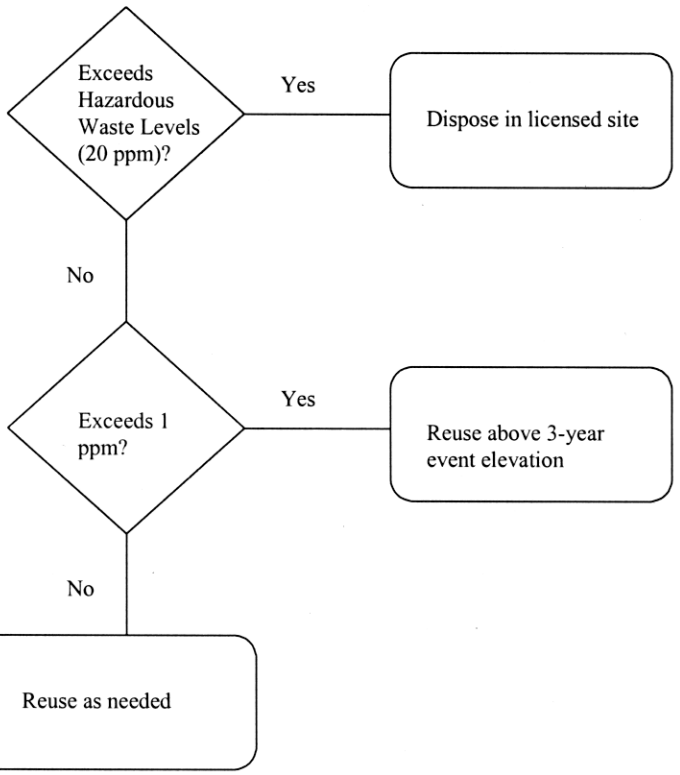

Figure 1: Decision tree for onsite soil reuse and disposal based on soil mercury concentrations.

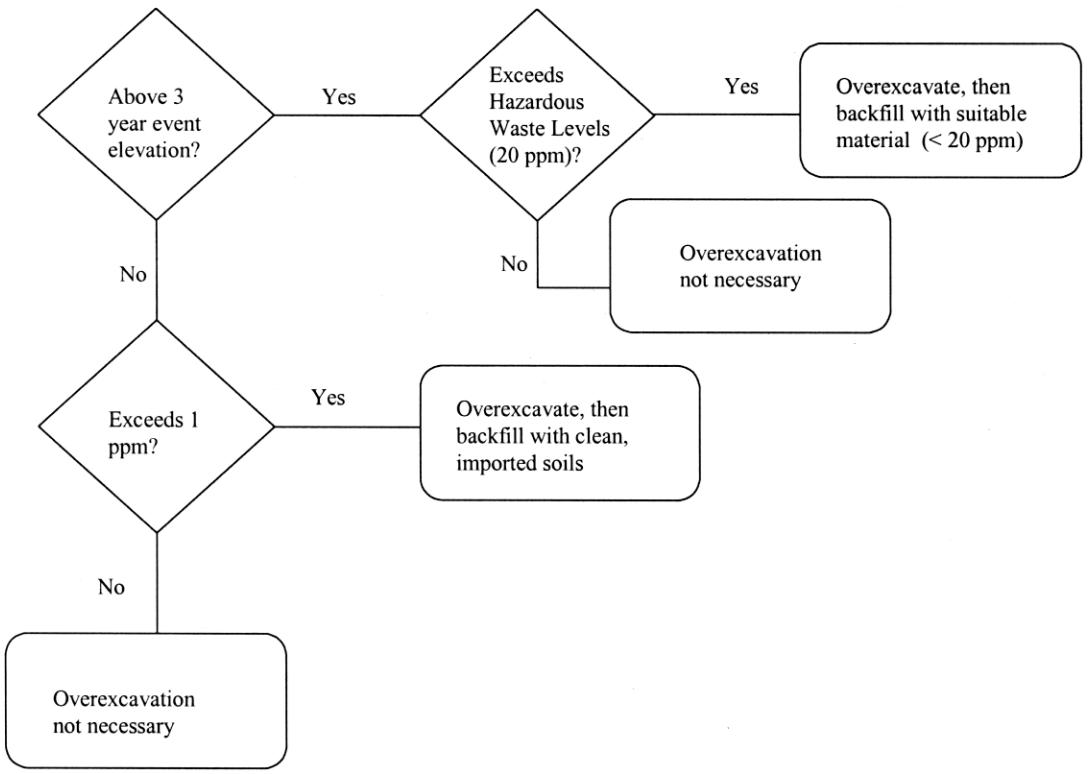

Figure 2 : Decision tree for overexcavation and backfilling based on soil mercury concentrations.